

August 8, 2001

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, N.W.
Washington, DC 20554

EX PARTE

IN THE MATTER OF CC DOCKET NO. 94-102

Comments of U.S. Wireless Corporation on Mobile-Assisted Network Location System ("MNLS") Performance Analysis

Dear Ms. Salas:

U.S. Wireless Corporation ("U.S. Wireless") hereby submits the following *ex parte* comments on the performance analysis of the Mobile-Assisted Network Location System ("MNLS"), as related to AT&T Wireless Services, Inc.'s ("AT&T") request for waiver.

Report Executive Summary

In the attached report, a detailed analysis of MNLS performance is presented. MNLS represents a family of techniques designed to locate wireless IS-136/54 TDMA handsets, as required under the Commission's 94-102 mandate for wireless E911 location services. The MNLS technique described in this report is based on proprietary U.S. Wireless Corporation Location Pattern Matching technology (LPM). Both theoretical (model-based) and empirical field test performance analyses are presented.

The theoretical analysis presented herein utilizes established propagation models and is developed for both ideal and actual carrier market conditions. Two model classes are considered, including the log-normal shadowing model and a CRC-based model. The CRC model is computed for two TDMA cellular markets including Oakland, CA and San Ramon, CA, representing an urban and suburban environment, respectively. For both markets, the models incorporate detailed carrier network data (such as cell site locations, antenna models, etc.) as well as terrain and clutter data. Simulation analysis for both the log-normal and CRC models predict that an MNLS system based on LPM technology would be capable of achieving performance better than 250m for 67% of the location fixes and better than 750m for 95% of the cases, under nominal operating conditions. A variety of special test cases are also considered which reveal the expected performance impact of variations in particular MNLS and Mobile-Assisted Handoff (MAHO) data parameters. The strongest parameter influences are predicted for changes in the MAHO time averaging interval (pre-processing of the MAHO data by averaging consecutive samples), the degree of correlation between pairs of channel measurements, and the number of channels in the MAHO neighbor list.

Empirical field test performance results are presented for MNLS testing conducted in the San Ramon and Oakland, CA test regions over a six-day period. Performance is

evaluated for the identical test regions as were modeled in the theoretical analysis, to facilitate comparison and to establish the validity of the selected propagation models. MAHO data measurements were collected using two Ericsson TEMS Investigation TDMA 800/1900 air interface test tools and three unique TDMA handset models. A set of predetermined drive routes and stationary points were specified to provide comprehensive coverage and representative measurements of the conditions and operating environments expected within the designated test areas. Routes were typically repeated 4-6 times while systematically varying such parameters as the handset model, mobile speeds, antenna polarization, and time of day. A total of 390,362 MAHO data measurements were collected in Oakland, CA and 264,262 samples collected in the San Ramon, CA test region.

The statistical fluctuations of the MAHO data measurements are characterized in terms of two metrics - the Absolute Power Metric (APM) and Pairwise Power Difference Metric (PPDM), for the complete data sets collected in each market. The average standard deviation of the absolute power fluctuations within a 50m bin was found to be 9.66dB and 9.17dB for the Oakland and San Ramon markets, respectively. Similarly, the fluctuations of the pairwise measurements were found to be significantly more robust and less variable, exhibiting values of 4.36dB and 4.21dB for the Oakland and San Ramon markets, respectively.

The overall MNLS performance was measured and characterized in both test markets and was found to be in strong agreement with that which was predicted by the CRC model simulations. In the Oakland field test, the system achieved an overall MNLS accuracy of 183m for 67% of the location fixes, and 629m for 95% of the cases. For the San Ramon test region, the MNLS system achieved an overall accuracy of 214m for 67% of the location fixes, and 544m for 95% of the cases. The influence of variations in key MNLS system and MAHO data parameters were selectively isolated and evaluated, revealing trends similar to those predicted by the performance modeling and simulation analysis. In particular, variations in the handset model and handset orientation were found to have little impact on MNLS accuracy performance.

If we can be of further assistance to the Commission in this matter, please do not hesitate to contact the undersigned.

Sincerely yours,

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